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When we come to consider the theoretical conclusions which Seward and Ford feel called upon to bring forward relative to the Lycopodian ancestry of the Araucarieæ, which conclusions are evidently those of the senior author, we cannot assent to any of them, and while it is expressly stated that they do not include the other Coniferales—the Araucarieæ standing far removed from them, it is impossible to understand, as has been already pointed out by Dr. Scott, how the Araucarieæ can be disassociated from their present position in the order Coniferales, which is an eminently natural group as it stands.

In conclusion to refer briefly to Professor Oliver's address on 'The Seed, a Chapter in Evolution,' it may be said that it is a delightful sketch of the possible origin of the seed-habit, couched in a popular style and full of pertinent and suggestive points.

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BOTANICAL NOTES

THE COLLECTION AND STUDY OF VEGETABLE GALLS

Botanists should not neglect the collection of vegetable galls of all kinds, whether caused by plant or animal parasites, since in either case the galls themselves are plant growths. These galls have been studied for some time by Dr. Mel. T. Cook, now of the New York Botanical Garden, Bronx Park, New York City, and he now asks all collectors to aid him in securing as many specimens as possible for his use. He asks that collectors bear the following suggestions in mind.

1. Many species of hard, woody galls should be dried and kept in boxes.

2. Most species of leaf galls should be dried in the same manner as herbarium specimens, except that the weights used should usually be much less—only sufficient to keep them straight.

3. Succulent species which lose their characteristic form in drying should be preserved in alcohol or formalin.

4. The host plant should be determined, or sufficient material sent to permit satisfactory determination.

5. The species should be wrapped separately in paper, or preferably in 'cheese cloth' so that any insects which mature in transit may be kept with their respective galls.

6. While galls produced by both insects and fungi are desired, it should be remembered that Dr. Cook is making a special study of the *galls* rather than the insects or the fungi. The work is strictly botanical, and he, therefore, appeals to botanists to aid him.

7. When the specimens are ready send them to Dr. Cook, at the address given above, accompanying them with an explanatory letter.

MORE PHILIPPINE BOTANY

The closing number (December) of the *Philippine Journal of Science* contains two articles of botanical interest, viz.:—'The Physiologically Active Constituents of Certain Philippine Medicinal Plants,' by R. F. Bacon, and 'Philippine Fibers and Fibrous Substances,' by G. F. Richmond. The latter is illustrated by several plates. During the year there have been printed in this publication eight botanical papers, and if we add those printed in the five supplements, the number is brought up to nineteen. These supplements, which have been wholly botanical, make a good-sized volume of themselves, covering about 400 pages. Added to the 1,100 pages of the *Journal* proper, the total result is about 1,500 pages of scientific matter for the year. As previously announced, the *Journal* will be divided hereafter, so that the botanical papers will constitute a series by themselves.

In the closing number of the 'Supplement' series E. D. Merrill contributes an interesting paper entitled 'An Enumeration of Philippine Gramineae, with keys to Genera and Species,' covering eighty-six pages, and including notices of seventy-two genera and 226 species and varieties. The paper is almost wholly based on material collected since the American occupation of the islands, and all species not verified by actual specimens are referred to the lists of 'doubtful or excluded' species, which are appended to the genera or tribes. Hackel's well-known monograph is followed rather closely in arrangement and nomenclature.

In looking over the tribes one finds many familiar genera, more than half being more or less common in this country. Thus one finds *Andropogon* (18 species), *Paspalum* (4 sp.), *Panicum* (34 sp.), *Setaria* (4 sp.), *Leersia* (1 sp.), *Sporobolus* (3 sp.), *Agrostis* (1 sp.), *Aristida* (3 sp.), *Calamagrostis* (2 sp.), *Diplachne* (1 sp.), *Eragrostis* (10 sp.), *Poa* (2 sp.), *Bromus* (1 sp.), etc. Four genera and thirteen species of bamboo (*Bambuseæ*) are recorded, but as to these the author states that his treatment is still necessarily incomplete, owing to the rare flowering of most of the species, and the unsatisfactory condition of the available herbarium specimens. The author concludes that 'on the whole, the Philippine Gramineae are strongly Malayan or Indo-Malayan, with a decided northern element in the highlands of northern Luzon, and a rather characteristic [north] Australian one.' In this connection the reader may profitably consult C. B. Robinson's paper on 'Some Affinities of the Philippine Flora' in the January number of *Torreya*.

Here may well be mentioned four pamphlets from the Philippine Bureau of Forestry, consisting of the annual report of the director, Major G. P. Ahern (including sixteen fine plates, most of which are of botanical interest); Bulletin 4 (including a paper on mechanical tests, properties and uses of thirty woods, and another on Philippine sawmills, lumber market and prices); Bulletin 5 (including a working plan for a forest tract on Negros Island, with twelve plates and a map); Bulletin 6 (including a working plan for a forest tract on Mindoro Island, with fourteen plates and a map). These bulletins contain much matter of interest to the general botanist, as well as to the forester.

EFFECTS OF SHADING ON SOIL CONDITIONS

THE Bureau of Soils of the United States Department of Agriculture has published a bulletin (No. 39) prepared by Mr. J. B. Stewart, on the effects of shading on soil conditions which is of much interest to plant physiologists. He shows that under the protection of a tent (1) the soil retains more moisture, (2) the temperature of the air is slightly warmer, (3) the relative humidity of the atmosphere is greatly increased, diminishing the transpiration of the plants and increasing their turgidity, (4) the velocity of the wind is reduced, still more reducing evaporation, (5) the plants make a larger, more rapid and earlier growth. The exact data for 1, 2 and 3 are as follows, in averages for the season:

	Inside tent	Outside tent	Difference
Soil moisture	14.7%	11.6%	3.1%
Temperature	72.8°	71.4°	1.4°
Relative humidity ..	79.0%	71.7%	7.3%

The growth of plants inside and outside of the tent is plotted on cross-section paper, showing very plainly that the plants in the tent grew faster and larger, and matured at an earlier date than the plants outside. The author points out, however, that "while the plants grew faster, and the leaves larger, the yield per acre was less by 100 to 300 pounds inside the tent than outside. This was probably due to the influence of the shade, which tends to make the surface of the leaves larger, but at the same time much thinner."

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MEMBRE DE L'INSTITUT

BUT what I can not put into these successive chapters, is the joy I experienced in pursuing these discoveries. To walk in a newly-turned furrow, to feel one's self untrammelled, to see new subjects for study spring up on all sides, is so delightful that it can not be fully comprehended except by those who have experienced the ardent pleasure of research.

With this closing to a preface, Moissan throws open the door and invites us to participate with him in the discoveries made with the electric furnace. This most skillful of experimenters, having won his spurs in the conflict of isolating fluorine, thus distancing all others who had attempted the task, he attacks new problems with zeal, and the ability of an accomplished craftsman. He was truly

[1] Read before the New York Section of the American Chemical Society.